CLAIMS

What is claimed is:

1. A heat exchanger comprising:

a plurality of first tubes in which a first fluid circulates;

first fins for facilitating heat exchange, the first fins being arranged between the first tubes;

a plurality of second tubes in which a second fluid circulates;

second fins for facilitating heat exchange, the second fins being arranged between the second tubes;

header tanks communicating with both the tubes, the header tanks being arranged at both longitudinal end sides of both the tubes;

at least two pieces of separators for dividing a space in the header tank into a first space communicating with the first tubes and a second space communicating with the second tubes, the two pieces of separators composing a third space between the first space and the second space;

at least two pieces of third tubes for connecting a portion corresponding to the third space of the header tank on one longitudinal end side of both the tubes with a portion corresponding to the third space of the header tank on the other longitudinal end side; and

fin arranged between the third tubes, wherein

the size of the first tubes and the second tubes is the same as that of the third tubes, and the size of the first fins and the second fins is the same as that of the fin arranged between the third tubes.

2. A heat exchanger according to claim 1, wherein a hole for communicating the third space with the outside of the header tank is formed in the third space corresponding portion of the header tank corresponding to the third space.

3. A heat exchanger according to claim 2, wherein both the tubes are provided extending in the vertical direction, and the hole is provided in the header tank on the lower side.

4. A heat exchanger according to claim 1, wherein the temperature of the first fluid is higher than that of the second fluid.

5. A heat exchanger according to claim 1, wherein the engine coolant flows in the first tubes and the electric system coolant for cooling an electric motor and a control circuit for the motor flows in the second tubes.

6. A heat exchanger according to claim 1, wherein the header tank includes a core plate into which the longitudinal end portions of the first tubes, the second tubes and the third tubes are inserted and a tank body for defining the space in the header tank together with the core plate, and wherein the tubes, the fins and the core plate are made of aluminum and the tank body is made of resin.

7. A heat exchanger according to claim 1, wherein the header tank includes a core plate into which the longitudinal end portions of the first tubes, the second tubes and the third tubes are inserted and a tank body for defining the space in the header tank together with the core plate, and wherein the tubes, the fins, the core plate, the tank body and the separator are made of aluminum.

8. A heat exchanger according to claim 7, wherein the core plate and the separator are joined to each other by means of brazing.

9. A heat exchanger comprising:

a plurality of first tubes made of metal in which a first fluid circulates;

a plurality of second tubes made of metal in which a second fluid circulates;

header tanks made of metal communicating

with both the tubes, the header tanks being arranged at both longitudinal end sides of both the tubes; and

two pieces of separators made of metal for dividing a space in the header tank into a first space communicating with the first tubes and a second space communicating with the second tubes, the two pieces of separators composing a third space between the first space and the second space; wherein

the two pieces of separators are joined by brazing to the header tank under the condition that the two pieces of separators are inserted from the slit hole formed in the header tank into the header tank, and a hole for communicating the third space with the outside of the header tank is formed in the third space corresponding portion corresponding to the third space in the head tank.

10. A method of manufacturing a heat exchanger,

the heat exchanger comprising: a plurality of first tubes made of metal in which a first fluid circulates; a plurality of second tubes made of metal in which a second fluid circulates; header tanks made of metal communicating with both the tubes, the header tanks being arranged at both longitudinal end sides of both the tubes; and two pieces of separators made of metal for dividing a space in the header tank into a first space communicating with the first tubes and a second space communicating with the second tubes, the two pieces of separators composing a third space between the first space and the second space; wherein the two pieces of separators are joined by brazing to the header tank under the condition that the two pieces of separators are inserted from the slit hole formed in the header tank into the header tank, and a hole for communicating the third space with the outside of the header tank is formed in the third space corresponding portion corresponding to the third space in the head tank,

the method of manufacturing the heat

exchanger comprising the steps of: coating flux on the separator after the separator has been inserted into the header tank; and then brazing the separator and the header tank to each other.

11. A method of manufacturing a heat exchanger according to claim 10, further comprising the step of inspecting and repairing a brazed portion of the separator and the header tank after the separator and the header tank have been brazed to each other.